

Kapisen

Plant Conservation Action group **Newsletter**

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Issue 11

Threats to Plants in Seychelles

Threats to plants in Seychelles

2010 has been the UN year of biodiversity. It was hoped that it would be a year of much progress for biodiversity conservation, but it became mainly another year of bad news for biodiversity. Just a few weeks ago Kew Botanic Gardens announced that one fifth of the world's plants are under threat of extinction (<http://www.kew.org/news/one-fifth-of-plants-under-threat-of-extinction.htm>). The situation may be even worse for island plants, as has been documented in a recent literature review (Caujapé-Castells et al. 2010. See New Literature p.22).

As a basis for reversing this bad situation for plants, we need to know what threatens rare plants. In this issue of Kapisen we have therefore assembled a number of articles that discuss the different threats facing the Seychelles flora. In an introductory article Katy Beaver guides you through the range of threats and helps you to connect the different articles (p. 3).

Not all is bad news though. This issue of Kapisen also reports on a number of local and international activities that take the plant extinction crisis seriously and attempt to improve the situation for island plants. On an international level, a Global Island Plant Conservation Network was formed at the 4th Global Botanic Gardens Congress in Dublin (p. 17). Locally in Seychelles, PCA has been active on a number of issues (p. 16), and we regularly motivate people from all walks of life to explore the beauty of Seychelles plants in the wild during our field trips (p. 18). Also plant research is lively in Seychelles, as shown by the long list of new articles (p. 22).

You can experience yourself the struggle of a rare Seychelles plant faced by manifold threats through playing the game on p. 14. Last but not least, have you ever heard of Bwa matlo? No? Then check out Peter's new cartoon (p. 17).

You may also notice a new feature we added to this issue of Kapisen: a box called "In a Nutshell" next to the article on Plants and Pollinators (p.11). We welcome feedback on this feature: Do you find it useful? Would it help to have "In a Nutshell" boxes for other articles? If so, which ones? Please send an email to kbeaver@seychelles.net.

We hope that you enjoy this 11th issue of Kapisen!

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Editors

The electronic pdf version of Kapisen can be ordered from boga@seychelles.net or downloaded from <http://seychelles-conservation.org/kapisen.aspx> or www.plantecology.ethz.ch/publications/books/kapisen



Photo front cover

Our newsletter namesake 'Kapisen' (*Northea hornei*) is in the foreground, with tooth-like Morne Blanc behind in the sunshine. But what lies ahead for the plants of Seychelles? (K. Beaver).

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Threats to Seychelles native flowering plants

By Katy BEAVER

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When most people think of plants they think of the flowering kind, for example ornamental plants with pretty flowers, or plants that are useful in some way (e.g. timber trees and food plants), or anything big and green that grows in soil, sand or mud. In the granitic Seychelles we have around 180-200 different species of **native flowering** plants but well over a thousand species of **introduced (= alien)** plants. Of the native flowering plants, about 70 are full **endemic** species, i.e. found nowhere else in the world. Unfortunately 70% of these endemic plants are threatened with extinction or with severe reduction of their populations. This article explains some of the different reasons for the reduction and also other threats to our native flora.

When humans settled the Seychelles granitic islands, they cut down the forests, felling all good timber trees and clearing land for houses and agriculture. This resulted in **overexploitation** of native tree species and **habitat destruction**. Once the native timber was finished, much of the land was used to grow plants that could earn money for the country. At the same time, the remaining forest was invaded by introduced cinnamon trees, which competed with the native plants for light, water and nutrients and resulting in **habitat alteration**. As the human population grew, the need for land increased, and it continues to increase, thus continuing the process of habitat alteration. In addition, **fire** has been a major factor leading to habitat loss and to **land degradation** through erosion of soil from land left bare by the fire. This has been a particular problem on Praslin (see p. 6). As a result of all these factors, today less than 5% of the original native habitat remains intact!

Given the scale of past habitat destruction, it is amazing that we have lost only about two species of endemic flowering plants as far as we know. However, populations of many native species are now small, scattered and often far apart. In ecology this problem is known as **fragmentation** and it is worse for plants with **small populations**. Imagine 5 people living near the top of Morne Blanc, 1 person living at the top of Morne Seychellois and 2 people living at the top of Mt Sebert - it would be difficult

for the 3 groups to meet each other, exchange food or gifts, or find wives and husbands! Plants also need such exchanges, particularly of pollen, which enables the swapping of genetic material that is vital for the health of small populations. This problem is faced by many of our native species (see p. 11).

Another problem for some plants is that other organisms that they depend on, called mutualists, may have disappeared. We refer to this problem as a **lost mutualism**. Some endemic plants have special relationships with other organisms in their habitat, such as a pollinator insect (e.g. a native bee), or a seed disperser (e.g. did the extinct Green Parakeet disperse 'Bwa kato' seeds?), or even a particular fungus (known as a mycorrhiza) which grows inside or around the roots of a tree and helps it to obtain nutrients from the poor soil. The organism benefits from the relationship by getting food and the plant is helped through pollination or seed dispersal or growth enhancement. The benefits are mutual. If one organism becomes extinct, the other may become extinct too!



Does continued development contribute to fragmentation of native plant populations? (K Beaver)

Many alien species have been introduced to Seychelles. Of these, most were brought in to benefit human livelihoods. However, some of them escaped and became weeds in natural areas, and these are called **alien invasive species**. The beneficial plants are numerous, for example people introduced food crops as there were none here (see also p. 8). They also brought in fibre plants and medicinal plants, e.g. Sisal/'Lalwa' and Madagascar periwinkle/'Rozanmer'. Over the years, various economic crops such as spices, cotton, rubber and vanilla were introduced. Other plants were brought in to combat soil erosion and at the same time provide timber. Clearly, introduced plants are not bad in

themselves but unfortunately when they are put into a new environment where they can grow well and are free of predators and pests, they sometimes grow too well, spreading into other areas and becoming invasive (see p. 15). It seems to some of us that these plants have 'taken over' our islands but other people seem unaware of the harmful nature of such invasions.

It is not only alien plants that are a problem either - there are plenty of other alien species that have been introduced and cause damage, whether as herbivores (e.g. rats, mice, insect pests) or as diseases (e.g. Takamaka disease). **Alien pests and diseases** may become more of a problem in the future unless we are careful to keep new ones out and control the ones we already have (see p. 15).

Unsustainable harvest of native plants is of significance for a few of Seychelles endemics, such as the medicinal plants Bwa dou and Bwa dir blanc. Coco de Mer nuts currently have such a high economic value that too few are being planted or germinate successfully to ensure a safe population in the long-term future (Rist et al., see new literature p. 22).

There may also be new emerging threats. **Climate change**, for example (see Box on p. 5), is a big 'unknown' because we do not yet understand enough about how native and alien plants will respond to increasing temperatures and levels of atmospheric CO₂. The cloud layer that enables the growth of unique mountain cloud forests such as at Congo Rouge and Morne Seychellois, with many rare and specialised endemic plants, could shrink in size or possibly disappear altogether. Plants that live at these altitudes are likely to move higher up the mountains, but once they reach the top there is nowhere to go! Also, an increase in extreme events such as storms or drought is likely to affect native plants in some habitats, e.g. coastal areas, wetlands, exposed slopes and 'glacis', small islands. Long droughts could also create ideal conditions for fire to spread, especially in the dry palm forests of Praslin.

Socio-economic threats such as an expanding human and tourist population results in increased demand for all resources, including land and water, which of course will affect plant habitats. But for Seychelles, these factors have had less effect recently on endemic plants because the native vegetation had been so altered by humans in the previous two centuries and most endemic plants live at higher elevations. In fact the reputation Seychelles has earned for its forest-covered mountains and

relatively unspoilt beauty is a factor in plants' favour as environmental issues are given a high priority by the government.

So, what is Seychelles doing about these threats to its unique endemic flora? One of the main things has been the creation of **protected areas**, the most recent of which is the majority of Silhouette Island, our third largest granitic island. Secondly, we have a **National Strategy** for Plant Conservation, which will be updated shortly and also a Plant Conservation **Research Agenda** (see p 24). Thirdly, more and more degraded habitats are being rehabilitated, and **restoration** has become a priority, including on islands with hotels which are contributing financially to the restoration process. Fourthly, **ex-situ conservation** of native plants has been actively promoted at the Biodiversity Centre at Barbarons. Fifthly, major national projects are contributing to such issues as **tackling Invasive Alien Species** and new **Biosecurity** laws and regulations. Sixthly we have our NGO **Plant Conservation Action group** (PCA) and there are now at least five **other NGOs** with an interest in habitat restoration. This newsletter, **Kapisen**, is devoted to plant conservation and PCA also tries to be involved in other **outreach activities** (p. 16). In addition, a new **network** of people working in island plant conservation was recently set up (see p. 17) and includes a number of Seychellois.

Does this mean everything is great? Unfortunately there still remain serious **weaknesses** in Seychelles regarding plant conservation. Firstly, it still tends to be given a **low profile** except in terms of planting more native trees and vegetation rehabilitation - and often this is carried out without the necessary understanding of the ecosystem as a whole and the need for a long-term approach. The low profile is reflected in the fact that we still have **no** fully trained **Botany graduates** and there is **lack of certain expertise** (e.g. taxonomy, research techniques) and we also still **lack a research institute**. Our national **herbarium** remains very small and much in need of expanding and upgrading, with proper curation. And one final weakness is that we often depend on outside expertise and **funding** for projects related to plant conservation, although there are an increasing number of public-NGO-private partnerships within the country. Strengthening these areas will be important.

Climate change in Seychelles

There is now conclusive scientific evidence that there is warming of the global climate system, and it is accelerating. The world faces an average temperature rise of around 3°C this century if greenhouse gas emissions (e.g. CO₂, methane) continue to rise at their current pace and are allowed to double from their pre-industrial level. Seychelles has not been spared by climate change and the threat is real.

Seychelles has a tropical maritime climate, i.e. strongly influenced by the ocean, especially through changes in monsoonal winds, ocean currents and sea surface temperature patterns. Complex interactions between these processes control the Seychelles climate system. The effects of global warming on these interactions are difficult to predict, partly because they occur on different time cycles and also because the islands of the Seychelles archipelago are small and scattered over a large area. The normal climate system is of two alternating seasons: strong trade winds from the SE from May to September, with slightly cooler temperatures and localised cloud systems bringing light to moderate rain. From November to April the winds are lighter and from the NW, periodically interrupted by heavy rainfall associated with the ITCZ (Inter Tropical Convergence Zone). It is also known that the El Nino and La Nina cycle events can affect our weather patterns.

Analysis of temperature and rainfall data for Mahé has shown that there has been substantial climate variability over the past hundred years in the Seychelles. There have been large variations between years and decades, sometimes as much as 20% difference between each period. For example, rainfall for the period 1972-2007 was particularly high and for 1938-1958 particularly low. Nevertheless, with respect to temperatures, the current trend shows an increase in mean air temperature for Mahé and undeniable evidence of warming over the past 36 years. The number of very warm days and nights is increasing while the number of very cool days and nights is decreasing.



Storm damage on North Island. Storms are likely to increase in number and strength (L Vanherck).

Recent studies from 2007 show that in the future there are likely to be marked variations in the seasonal rainfall pattern, with the dry season becoming drier and warmer, causing more acute droughts than in past years. The rainy season will become wetter, which could cause more flooding and landslides. Extreme weather events are likely to become more frequent. Recent examples have been the off-season floods of August 1997, the storm over Praslin in September 2002 which caused considerable damage to infrastructure and the environment, and Cyclone 'Bondo', the first category 5 storm to make landfall in 135 years in Seychelles, over the southern islands in December 2006.

Global warming is also causing abnormal increase of sea-surface temperatures, which leads to sea level rise due to the expansion of the ocean. This creates the risk of impacts along the coastline through sea surges, beach erosion and inundation by sea water.

Information summarised from the following report: *W Agricole (2010) 'Enabling activities for the preparation of the Seychelles 2nd national communication to the UNFCCC: National Circumstances', MENRT, Government of Seychelles*

Sur les feux de forêt aux Seychelles: causes, conséquences et solutions

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I. Les causes

Lorsque l'expédition Marion-Dufresne s'investit d'explorer l'intérieur de l'île Moras (l'actuelle Praslin), en 1768, Lampéaire fit mention pour la première fois de traces de feux, près de l'anse Possession: "Pas un seul arbre que quelques pins sauvages, des espèces de palmistes jusque sur le sommet des montagnes, des cocotiers le long du rivage. Dans les endroits où il n'y a point d'arbres ou dans ceux où le bois est très clair le terrain est rougeâtre et semble avoir été brûlé, dans des endroits mêmes les pierres paraissent calcinées." (Lionnet 1984: p.50). L'autre partie de l'expédition qui explorait l'île Séchelles (l'actuelle Mahé) ne fit guère mention de terres brûlées bien que la terre y soit souvent dite sèche et dominée par les palmistes, sur un ton guère plus optimiste. Qu'est-il donc arrivé aux fabuleuses îles d'Abondance de Lazare Picault (1742), à ce "earthly

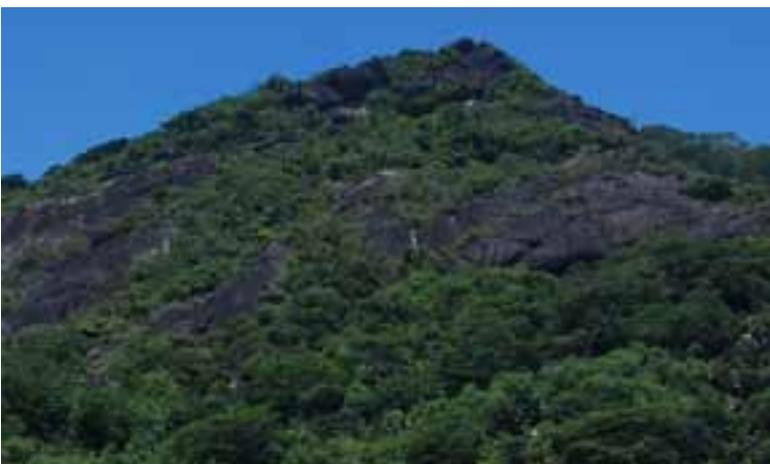


Photo 1. Mosaïque de types de végétation associés aux glacis de basse altitude, ici dans le Sud de Silhouette. Les parties en mi-pentes sont bien souvent des forêts saxicoles dominées par les palmiers. Dans les parties basses, recueillant les pluies drainées par le glacis, la forêt est plus humide et des forêts mixtes de basse altitude restent peut-être à découvrir (B Senterre).



Photo 2. Forêt relativement intacte, au centre de Praslin. On y voit des zones de glacis et des forêts sèches dominées par les palmiers (B Senterre).

paradise, totally virgin from the human's footprint, and with abundance of everything" décrit lors de l'expédition dirigée par Sharpeigh un siècle et demi plus tôt, en 1609?

La possibilité de feux naturels n'est pas à exclure, mais attention aux généralisations. Premièrement, de la forêt tropicale humide ça ne brûle pas comme ça. Mais par ailleurs, il n'y a pas que de la forêt humide aux Seychelles. Les forêts de palmistes auxquelles faisait allusion Lampéaire sont des forêts plus sèches (le "dry palmetum" de Vesey-Fitzgerald 1940), en raison d'une combinaison de facteurs tels que la pluviosité mais surtout la pente, la profondeur du sol, l'altitude, etc. (Photo 1, 2). On les trouve typiquement en marge des glacis où on les appelle alors parfois forêts "saxicoles", i.e. littéralement "poussant sur la roche". Ces forêts là ne brûlent pas non plus, mais sont plus sensibles. En revanche, les tapis herbacés des glacis, à Bracken fern et Lerb razwar, peuvent brûler de manière naturelle, bien que rarement, et bien que ceux-ci étaient vraisemblablement assez localisés dans la végétation d'origine.

Une origine strictement anthropique de la dégradation par le feu d'îles telles que Praslin n'est elle aussi pas à exclure: repères de pirates au 17^{ème} siècle, lieux d'affrontements entre français et anglais vers la fin du 18^{ème}, querelles pour le monopole de la noix légendaire à la même époque, déboisement intensif au 19^{ème} siècle combiné à l'agriculture sur brûlis, etc. Si la responsabilité des feux naturels reste une spéculation de botanistes, la responsabilité de l'homme ne fait aucun doute. Les premiers feux criminels sont rapportés dès la fin du 18^{ème} siècle, lorsque des raids anglais venaient incendier Praslin après avoir fait le chargement de coco fesses (McAteer 1991). Plus récemment, au 20^{ème} siècle, de nombreux feux criminels se sont répétés, le plus souvent pour des querelles personnelles ou en

signe de protestation politique. A peine 2 ans avant le dernier feu de Silhouette, Jeffrey (1962) écrivait "arson fire risk on this island is higher than ever". Et dans les archives, on ne trouve aucune mention de feu d'origine naturelle (Senterre 2009bc). Malgré cela, les feux de forêt sont toujours aujourd'hui considérés avant tout comme une fatalité, et les programmes de lutte passent avant les programmes de prévention.

II. Les conséquences ... à court, moyen, et à long terme

En quoi ces feux de forêt, et la "dégradation" des forêts humides en brousses secondaires qui s'en suit, posent-ils problème?

Le premier problème, à court et à moyen terme, concerne l'eau. Si on remplace la forêt humide par des brousses secondaires, ce n'est pas juste le paysage qui change mais aussi les services écologiques que fournissent ces différents écosystèmes. Non seulement la forêt permet de mieux retenir les eaux de pluies, et donc d'alimenter les rivières plus longtemps, mais par ailleurs ces forêts sont capables de créer leurs propres pluies. En Amazonie par exemple, pas moins de 50 à 80 % de la pluie qui tombe est générée par la forêt elle-même, i.e. coupez la forêt et il pleuvra 2 fois moins. Cela s'applique aussi à l'échelle d'une ville, ou d'une petite île. Et ce n'est pas fini, les forêts de montagne (surtout au-dessus des 500 m aux Seychelles) font encore mieux et parviennent à capter l'eau des nuages, ce qu'on appelle la "pluie horizontale". Coupez ou brûlez ces forêts là et il ne restera



Photo 3. Brousse secondaire en cours de régénération, après un feu de grande ampleur, en 1987 (Pasquièrre, Praslin). La végétation d'origine devait être une mosaïque de forêt mixte de basse altitude (feuillus et palmiers en mélange), peut-être similaire à la photo 2. Si tout va bien, ceci redeviendra une forêt de palmier dans un siècle ou deux (B Senterre).



Photo 4. Zone dégradée à Fond Diable (Praslin) résultant du passage de feux répétés. La couche de terre noire a disparu et l'argile sous-jacente a été cuite au soleil. La végétation d'origine devait être une mosaïque de franges arbustives, franges herbacées et forêts saxicoles, sans doute similaire à la photo 1 (B Senterre).

simplement plus assez d'eau pour la population des Seychelles.

Le deuxième problème, à moyen et long terme, concerne la perte de biodiversité. L'image de paradis terrestre que les Seychelles ont su entretenir jusqu'ici (image largement méritée), et l'attrait touristique qui va avec, est issue de ses montagnes vertes, avec abondance d'eau et d'espèces en tous genre, dont la grande proportion d'endémiques est devenue un slogan marketing. En plus de l'économie du tourisme, la biodiversité des Seychelles est une source de financements pour la recherche, et donc l'éducation, pour le développement durable, etc. (e.g. Programme des Nations Unies pour le Développement notamment). Enfin, il existe un potentiel non négligeable pour l'industrie pharmaceutique.

Les autres problèmes découlent de la perte de productivité des sols, à moyen et long terme. Une fois le sol forestier exposé, la pluie va rapidement (en moins de 2 ans) venir à bout de la couche supérieure de terre noire. Dans le meilleur des cas, le cycle de régénération d'une forêt mature est de près d'un siècle. Une zone touchée par un feu restera sensible pendant des décennies (Photo 3), et si un autre feu vient frapper à nouveau, avant que le cycle de régénération n'ait pu s'accomplir, la dégradation s'accroîtra encore. L'exposition au soleil finira le travail en cuisant le sol argileux sous-jacent et en le transformant en une cuirasse "ferralitique" (Photo 4). Le temps nécessaire pour reconstituer la végétation d'origine peut alors augmenter au point que le cycle de régénération paraisse "bloqué".

III. Les solutions ... à court, moyen, et à long terme

A court terme, il faut supprimer la source de dégradation. Il faut sensibiliser la population (moins de 100.000 habitants) sur le problème des feux de forêt afin de réduire le plus possible les feux criminels, et les négligences.

A court et à moyen terme, il faut s'assurer que le système de lutte contre les feux de forêt est bien opérationnel, et ce surtout pour les régions importantes en terme de biodiversité et de ressources en eau (parc national du Morne Seychellois, Montagne Planneau, Silhouette, ainsi que Praslin, La Digue et Félicité: voir Senterre 2009c).

A plus long terme, il faut réduire la sensibilité des habitats dégradés (les actuels brousses secondaires et terres rouges). Les méthodes de réhabilitation sont malheureusement bien souvent polémiques et remplies d'incertitudes: quelles espèces choisir, quelles méthodes pour les faire pousser, et pour quels types de sites dégradés, etc. (Senterre 2009a). Les facteurs et contraintes intervenant dans ces choix sont très nombreux, difficiles à évaluer voire inconnus, et interagissent entre eux. Il faut donc être prudent avec le concept très à la mode de "best practice", concept souvent simpliste et parfois objet de propagande.

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Genetic resources in the future development of agriculture

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Food security – a global challenge

The World population currently stands at 6.8 billion and is expected to grow at a rate of 1.14% per annum. Other expected global changes include the accelerated rate of urbanization, predicted to grow from 50% to 70% by the end of the next decade. Income levels are forecast to be higher than they are today with bigger disparities between rich and poor. Temperatures over most land areas are likely to rise. So too the global mean sea level. Changes

are expected in the distribution and intensity of precipitation. This will have a direct impact on the type of crops that are likely to grow better in certain ecological zones and will lead to changes in agricultural production areas and production practices. Already we can see signs of all these changes in our small island state. The Seychelles population is increasing by natural means and also through immigration and tourism. Seychelles will have to consider all these changes as we strive for a higher level of National Food Security.

21st century agriculture faces many challenges, the most fundamental of which will be the ability to increase food production to feed the growing population with a proportionally smaller rural area and labor force. Seychelles will also face this challenge. As more and more land is earmarked for social and economic development activities, the Seychelles agricultural sector will be forced to find innovative ways to utilize scarce land resources and adopt more efficient agricultural practices. Plant



Indian jujube / Masson (*Ziziphus mauritiana*) - traditional fruits supply essential vitamins and minerals (M Moustache).

breeders worldwide will be faced with the challenge to develop varieties of crops that are higher yielding and that can withstand a changing climate. There will be increased demand for world agriculture to adopt more efficient and sustainable production practices and reduce its negative impact on the environment and biodiversity. This will require reduced use of pesticides and improved varieties that are more pest resistant. Small island states like Seychelles will be particularly vulnerable being unable to benefit from mass production and economies of scale. Researchers and scientists, both local and foreign are already looking at more sustainable practices suitable for Small Island Developing States (SIDS).

The need for alternatives to industrialized agriculture

Strong consumer demand for cheap food of uniform and predictable quality has resulted in a focus on efficient and industrialized production methods. As a result, over the last decade, multi-national food companies have influenced food consumption in industrial countries and much food is now produced beyond their national borders. This food production and consumption pattern is also spreading to many developing countries, including Seychelles, which depends heavily on imported food for both the local and tourist populations, with a corresponding relative decrease in local food production.

The situation is quite different in the less developed world, where a substantial portion of food is still

produced with few, if any, external inputs and is sold locally. Such farming systems generally rely heavily on diverse crops and varieties, and in many cases on a high level of genetic diversity. This system of farming represents a traditional and widespread strategy for increasing food security and reducing the risks that result from the vagaries of markets, weather, pests or diseases. As developing countries continue to shift from subsistence to commercial agriculture, much of the diversity that still exists within these traditional systems remains under threat.

Yet another system of farming that has recently developed for more economically affluent people, especially in Europe and North America is the Niche or High Value Markets. These consumers prefer quality food that is locally produced in ecologically sound agriculture, under low input but controlled and certified conditions from known sources that the consumers trust. This trend has led to the development of certification schemes, such as 'fair trade', 'organic' and 'protected designation of origin', to help ensure standards and provide reliable source information. Today, there are even global movements that advocate the use of locally produced food, traditional crops and traditional varieties by drawing attention to food traditions, cultural practices and health benefits. With the effects of climate change and the global economic crisis, many SIDS including Seychelles will be able to survive only by developing sustainable living practices and this will include the use of local agricultural genetic resources to produce and consume locally grown foods.



Pigeon pea / Zanzobvat (*Cajanus cajan*) - an important food source in the 50s and 60s in Seychelles and an important medicinal crop (M Moustache).



Sharing genetic material ensures conservation for future generations (M Moustache).

The status of agriculture in Seychelles

There is general agreement for the need to adopt sustainable production practices with much greater emphasis on the use of indigenous plant genetic resources for food and agriculture and agro-ecosystem function. However, conservation and use of agriculture genetic resources are intrinsically and in many ways connected with, and dependent on, the political, cultural and economic status of agriculture. Over the last few decades the importance of agriculture in many national economies, including Seychelles economy, has declined and therefore with it, the public support for agricultural research and development. There has been some private investment in research and development but mainly for commercial agriculture and in those areas that have more immediate profitability. This lack of interest has resulted in the loss of many varieties of food and agriculture crops that were kept in ex-situ field gene banks, like those of the Grand Anse plateau up until quite recently, which are expensive to maintain and generate little revenue.

Recently, there has been renewed interest in agricultural issues following the global food crisis and rise in food prices, e.g. food security, climate change concerns and emerging prospects for increased use of biofuels. The challenge for the present is being able to build support for agriculture in the present political and economic climate and to place agriculture and food security as the major cross-cutting activity across all sectors.

Agriculture in Seychelles is characterized by several farming types, ranging from commercial hi-tech systems based exclusively on the use of hybrid seeds, to home gardens as a hobby activity or to supplement household income and produce fresh food for the home kitchen. Plant crops and varieties used in traditional Seychelles agriculture have been replaced to a great extent by modern improved seed varieties. There remain small pockets of traditional crops still grown in Creole home gardens or in 'heritage gardens'. Seeds in these cases are saved and stored and passed on from generation to generation.

Conservation of genetic resources of food and agriculture crops was a priority for the government in the 1960's, culminating with the establishment of the Grand Anse Experimental station in the early 1970's, supplying more than 20,000 orchard trees per annum to the general public. By 2008, this station had lost most of its ex-situ collection due to changes in government priorities. In effect, many traditional varieties of fruits and root crops now face a bleak uncertain future. There are presently no programmes in place to collect, conserve or distribute planting material of traditional food crops. However, the campaign entitled "every home a garden" has been running for more than 12 years and the Annual Agriculture and Horticulture show provides a platform for consumers and producers to meet and exchange ideas, knowledge and planting material. This concept will be particularly important for Seychelles food security in light of the small land area available for commercial agricultural production and the rough terrain.

There is no doubt that conserving agricultural genetic resources for the future are very important but particularly so in light of the need to respond to climate change. There is need to recognize and save those plants that can adapt and thus strengthen the evolutionary potential in order to safeguard the future of food sources. Field gene banks are necessary to protect the diversity that is threatened by climate change.

Plants and pollinators on inselbergs: how does plant invasion affect mutualistic interactions?

By Christopher KAISER-BUNBURY, Terence VALENTIN, James MOUGAL, Denis MATATIKEN and Jaboury GHAZOUL
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Botanically, the Seychelles are among the most fascinating of oceanic islands. Their great age, coupled with their geographical isolation, has resulted in a unique flora which has arisen more by evolution than immigration. Since human colonisation most native habitats have been converted and modified by habitat clearance and invasive alien species, which has permanently changed the character of most endemic communities on Seychelles. One vegetation element characteristic of the Seychelles, however, has remained largely intact. The granitic inselbergs (also called glacis) have strikingly different microclimatic conditions to their surroundings. Consequently, they harbour unique remnants of endemic plant communities which have been naturally protected against human disturbance and alien species. On these inselbergs you find peculiar species such as the endangered jellyfish tree (Bwa mediz) *Medusagyne oppositifolia* and the pitcher



An introduced honey bee feeding in the flower of an endemic palm (C Kaiser-Bunbury).

plant (Lalyann potao) *Nepenthes pervillei*. Despite their remoteness and inaccessibility, inselberg plant communities are currently experiencing the encroachment of alien plants, which may pose a threat to the viability of native plants and the persistence and integrity of the entire ecosystem. For example, pollination interactions play a vital role in the reproduction of most plant species, and empirical studies have shown that alien plant species alter pollination of neighbouring, mostly native, plants through shared pollinators.

To assess the impact of alien plant species on the endangered inselberg communities, a group of local and international researchers conducted an extensive field study. In particular, the research aimed to determine the role of pollinators in the dynamics of native communities and the impact of alien invaders on these processes. Between September 2007 and April 2008 a team of five researchers spent a total of 1170 hours in front of 38 plant species to observe pollinators of 97 taxa across six inselberg

Plants and pollinators on inselbergs - the article IN A NUTSHELL

- Alien plant species have often attractive flowers with lots of nectar and nutritious pollen. So when they grow next to native plants they can compete for pollinators, which can have negative consequences for the reproduction of the native plants.
- We studied this indirect relationship between alien and native plants on six Seychelles inselbergs, all of which contained a different amount of alien and native plants (see Fig. 1). A team of international and local scientists observed flower visitors (bees, flies, geckos, birds) by sitting for many hours in front of flowers.
- We showed that common native plants received many visits by pollinators, even at the site with the highest concentration of alien plant species.
- In those heavily invaded sites, however, a large proportion of visits were carried out by just one alien pollinator, the common honey bee (see Fig. 2).
- While common native species produced many fruits in the invaded areas, we have some indication that rare natives suffer more from reduced visitation by pollinators due to the presence of alien plants.
- We recommend that the restoration of inselbergs with many alien plants should be a priority to reduce competition for pollination.

Plants and Pollinators

sites: Bernica, Copolia, Trois Frères, La Reserve, Tea Plantation and Casse Dent. The sites were selected following a plant invasion gradient (see Fig. 1). Pollinators encompassed insects from six orders, two bird species (the sunbird (Kolibri) *Nectarina dussumierii* and the alien Madagascar fody (Kardinal) *Foudia madagascariensis*), and two endemic lizard species (the skink (Lezar mangouya) *Mabuya sechellensis* and the day gecko (Lezar ver) *Phelsuma astriata*). Amongst the insects, the bees and wasps were the second most species-rich group (16 spp.), accounting for the majority of visits (62.8%). Remaining visits were made by 42 species of flies (15.8%), 16 species of beetles (9.8%), six species of butterflies and moths (0.3%) and 13 other taxa (7.2%). Alien pollinators included the honey bee (Mous dimyel, *Apis mellifera*), wasps (e.g. yellow wasp, Mous zonn, *Polistes olivaceus*), birds and ants (Fourmi nwar).

In our study, we expected that alien plants compete with native species by attracting pollinators away from native plants, and therefore negatively affect their reproductive success. More specifically, we asked whether pollinator visitation frequency of native plants decreases with increasing invasion, and whether changes in pollinator foraging behaviour result in a decline in fitness among native plants. Our findings suggested that pollinator species richness and interaction frequency was only little affected by the presence of alien plants. Similarly, plant reproduction (here fruit set) of the most common native species was not affected by alien plants;



An endemic sunbird feeds on nectar from flowers of an endemic plant (Bwa bannann) (C Kaiser-Bunbury).

however, we could not study rare native species as there were too few individuals on each inselberg for appropriate replication. Observation data suggested that these rare species suffered from pollination limitation, as many produced only very few fruits and received hardly any visitors (if at all; e.g. (Bwadmontanny) *Camptosperma sechellarum*). Most interestingly, we showed substantial changes in the composition and distribution of plant-pollinator interactions at high but not at low levels of invasion. For example, introduced honey bees, one of the main flower visitors in our communities, visited many more flowers of alien species in the invaded sites than the endemic solitary bee *Lasioglossum mahense*, an equally abundant species (Fig. 2). This suggests

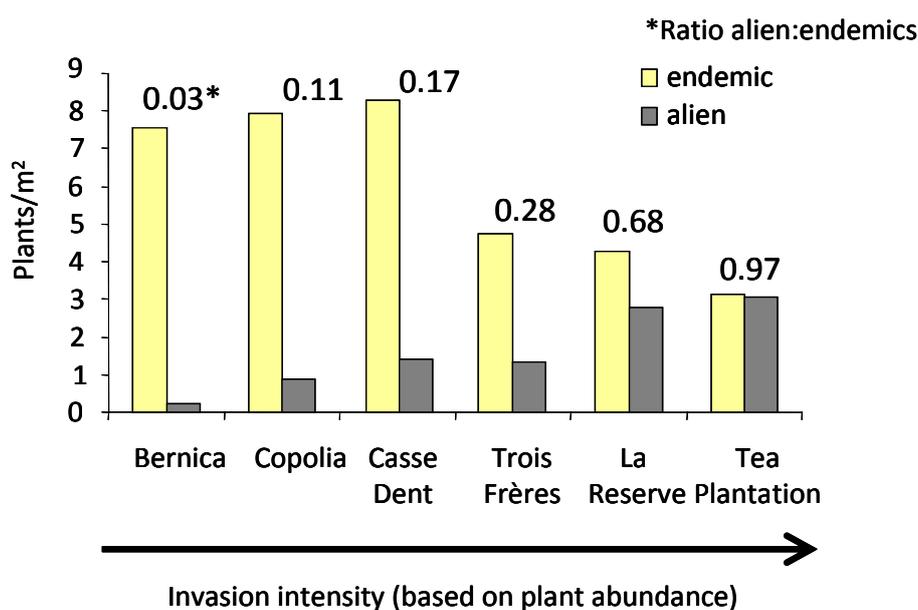


Figure 1 Number of adult plant individuals per unit area (1 x 1m quadrats) of endemic and alien plant species at the six study sites. The sites are arranged following an increased level of invasion from left to right (arrow). The numbers above the bars show the ratio of alien to endemic plants.

Plants and Pollinators

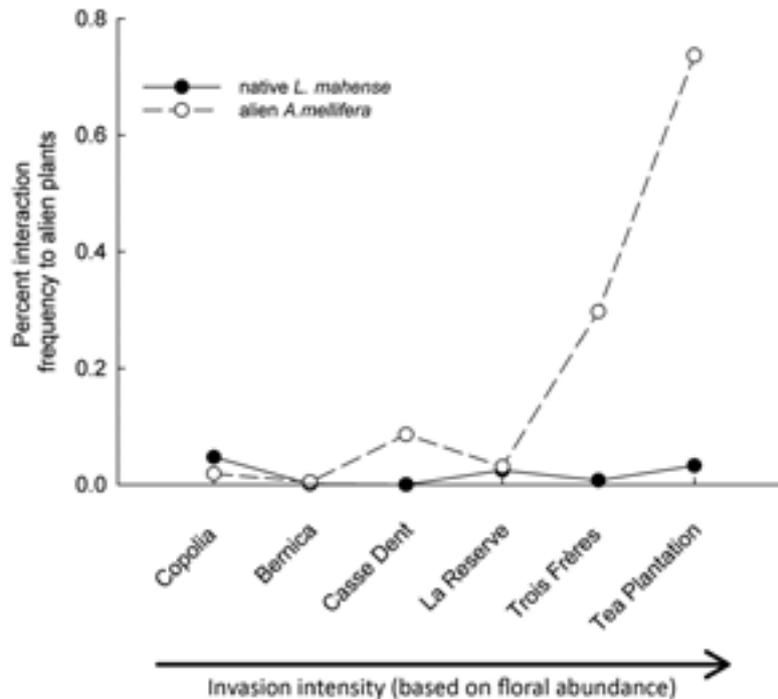


Figure 2 Percentage of all interactions to alien plants by the two most abundant and generalised pollinator species, the native solitary bee *Lasioglossum mahense* (full circles) and the introduced honey bee *Apis mellifera* (empty circles). The sites are arranged by increasing invasion intensity based on the ratio of alien to native floral abundance (please note that this is a different order to Fig. 1) from left to right. *Apis mellifera* shifted its visits from native plants to alien plants with increasing invasion intensity (after Kaiser-Bunbury *et al.* 2010).

that in contrast to the native pollinator *L. mahense* honey bees show little flower fidelity to native plants. This pattern is particularly severe at high levels of invasion when native plants become dependent on fewer pollinators and are therefore more vulnerable to future declines in those pollinators.

What conclusions can be drawn from our findings with regards to the viability of native inselberg communities? Plant-pollinator interactions and fruit set of native plants were little affected by alien plants in the communities when they occurred in low relative abundance. At this level, it seems unlikely that rare or specialised pollinators are displaced as a result of indirect plant competition for pollination. However, disruptions in pollination interactions are expected to set in with high levels of invasion intensity. We thus recommend that if a complete removal of alien plant species from native communities deems unfeasible or too costly, reducing the relative abundance of alien plants will increase the likelihood of native plant-pollinator interactions to persist. Controlling the relative abundance of alien plants could be done by regular weeding of the affected areas or by supplementing the native stock of plants through planting.

For a more detailed presentation of the data, analyses and discussion please refer to the recent publication by **Kaiser-Bunbury CN**, Valentin T, Mougai J, Matatiken D, & Ghazoul J. 2010 The tolerance of island plant-pollinator networks to alien plants. *Journal of Ecology* In press



Some of the Pollination Team members enjoying a break (C Kaiser-Bunbury).

Struggle for Survival

You need: one die; a counter for each player (maximum 4 people)

To play: The player who rolls the highest number starts. Each player represents some plant seeds. The game is like 'Snakes and Ladders'. If you land on a picture square, read the message, follow the arrows and find out what happens to your seeds. You get an extra throw if you throw a six, and you need an exact number to finish the game. Good luck with your seeds!

After you have played the game: How many of the threats to plants which are described in this issue of Kapsen are also found in the game?

100 FINISH	99	98 many seeds dispersed.	97 forest rat eats fruit.	96 seeds dispersed.	95	94 person chips down plant.	93 seeds travel far.	92	91
81 fruit and seeds form.	82 many seeds formed.	83 storm blows away flowers.	84	85	86	87	88 wind blows seeds.	89 many fruits formed.	90
80	79	78	77	76 plant survives.	75 pigeon eats fruit.	74 plant dead.	73	72	71
61	62 native insect pollinates flower.	63 no fruits formed.	64	65 no seeds.	66	67	68 many flowers produced.	69	70 fast-growing cinnamon cuts out lighter.
60 hiker tramples on plants.	59	58	57	56	55 insect pest eats leaves.	54 plant grows well.	53 no growth.	52	51 plant grows better.
41 plants die.	42	43 plant has its own chemical in its leaves.	44	45	46 disease affects seedling.	47	48	49 very dry weather.	50
40 seedlings grow well.	39	38	37	36 plant dies.	35	34	33 long roots reach water.	32	31
21	22	23 bird eats seeds.	24 plant dies.	25	26 seedlings grow well.	27 seeds land on eroded soil.	28 a tree falls and allows more light.	29 seedlings die.	30
20	19	18	17 no germination.	16 no germination.	15	14	13	12	11
1 START	2 seeds fall in rich organic soil.	3	4 90% seeds germinate.	5	6	7 plenty of rain showers.	8	9	10 no germination.

Management of Invasive Species in Seychelles

By James MOUGAL and Katy BEAVER

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As a consultancy for one of the local GOS-UNDP-GEF projects, PCA recently reviewed all historical and modern attempts to control and/or eradicate invasive species in Seychelles. The review was based mainly on documents but also expert knowledge collected through personal meetings and a questionnaire. The review took a fairly broad view of what is an invasive species - from alien pests that attack economic crops (e.g. coconut scale insects, fruit flies), to alien species that invade natural ecosystems (e.g. rats, Chinese guava - *Psidium cattleianum*), to a very few native species that created problems in an economically important situation (e.g. Melittomma beetle). The invasive species were grouped into different categories such as mammals, birds, agricultural pests, aquatic weeds, creepers. This makes it easier to locate information about a particular invasive species and find other species for which there may be similar management programmes.

There are basically four ways of dealing with invasive species which are already present in the country: 1) **Eradication** (total elimination, which is often very costly); 2) **Containment** (restrict the spread of the species to new areas - which is only possible if populations are small); 3) **Control** (long-term reduction of the invasive populations to an acceptable level); and 4) **Mitigation** (accept the presence of the invasive species and minimise its negative impacts). Control has been the main method for dealing with invasive species in Seychelles, with varying degrees of success. For some invasive species, information about control and eradication programmes in Seychelles was very limited, and there was often a lack of quantitative data and/or no information on the results of the programme, so it was very difficult to evaluate the efficacy of programmes. However, more recent eradication programmes have been increasingly successful, for example rats and cats on small islands e.g. North, Denis.

The most successful programmes in Seychelles have had a good management strategy in place. This includes preliminary population estimates; a



Clidemia hirta (Fo watouk), an alien plant now invading natural ecosystems on Mahe (E Schumacher).

feasibility study (e.g. testing of control techniques, risk assessment for native species, evaluation of capacity needs, funding sources, and possible follow-up requirements); systematic methodologies; monitoring throughout the programme and assessment of cost effectiveness. Unsuccessful programmes have failed for many different reasons. These varied from delay in initial response to a new invasive species, to *ad hoc* control programmes that were poorly planned, and from unpredicted negative effects of the control method on native species, to failure to set up protocols for prevention of reinvasion.

We recommend that all future invasive species management programmes in Seychelles follow a well-defined and planned management strategy to ensure greater success. We were unable to give best practices for many of these species in Seychelles due to lack of information on the efficacy of techniques and methodologies. Specific management practices used elsewhere in the world would mostly require testing in Seychelles before being endorsed. We also suggest that because many invasive species management programmes are expensive, it may be necessary to prioritise invasive species, whether at a national level, or at an organisational or land management level (e.g. for an NGO or an island). The follow-up to this review will be to produce a guide for land managers on overall best practices for IAS management in Seychelles.

Information based on "Review of IAS control and eradication programmes in Seychelles", eds. Katy Beaver & James Mougal, 2010. Report prepared by PCA for GOS-UNDP-GEF

PCA News

We have no major news items for this issue but there have been many small steps taking us forward on our journey for plant conservation in Seychelles. For example, ensuring our finances are in good order is important and we thank our very efficient treasurer Hugh Watts for undertaking that task. A more surprising addition for PCA is an unusual 'fund-gatherer' (see photo at right) in the departure lounge of the International Airport - a 'chameleon' collection box sculpted by local artist Egbert Marday. We hope that it will attract the attention of travellers who wish to donate loose change, thereby raising extra funds for PCA activities.



In the last issue of Kapisen we noted that PCA had completed an important review of invasive alien species (IAS) control and eradication programmes carried out in Seychelles. The report for this review was finalised early in the year and follow-up work should start soon on a guide booklet of good IAS management practices for land managers. Planning new projects takes up a lot of voluntary time and requires certain skills and a degree of patience, we are learning. PCA is currently going through this process for a new project proposal and we hope to be able to give you good news in the next issue of Kapisen!

A much smaller PCA project has been the production of a set of guidelines for organising hill walks, intended for the Sports Council and community groups. We also continue to work with North Island on the vegetation rehabilitation programme, with PCA providing advice, assisting with the annual review of the island's Vegetation Management Plan, monitoring progress, and researching cost-effective rehabilitation methodologies.

An exciting new development has been the formation of the Global Island Plant Conservation Network (GIPCN), a grouping to which several PCA members now belong. More information on GIPCN can be found on the following webpage of Botanic Gardens Conservation International (BGCI): <http://www.bgci.org/ourwork/islands/>. If you would like to become a member of the GIPCN list-server (mailing-list) then send a short email to Christoph Kueffer (kueffer@env.ethz.ch) with the following information: name, email address, institution, expertise related to plant conservation, and your islands of interest. The formation of this network was promoted by some of our overseas members at the 4th International Botanical Gardens Congress in Dublin, Ireland in June. The concluding Congress statement included a section on plant conservation on oceanic islands endorsing the immediate need for action to safeguard highly threatened island floras (see Box on p 17). Local PCA members also co-authored a paper about the status of plant conservation in the Western Indian Ocean region, which was presented at the Congress and will appear in the Congress Proceedings.

Talking of literature, PCA has acquired several more plant conservation books for its small library, and Seychelles Islands Foundation has reprinted a book by two of our founder members "Guide to Endemic Palms and Screw-pines of the Seychelles Granitic Islands" (D Matatiken & D Dogley, 2005, PCA). This book is now on sale at the Vallée de Mai Visitor Centre on Praslin and PCA receives a commission for each book sold.



With respect to outreach, our main activity in the past months has been a short presentation and a poster display (see photo on left) on the need for sustainable use of medicinal plants in Seychelles, particularly those that are endemic species. Several prominent local herbalists were present at this FetAfrik public event held in Victoria.

Statement of the 4th Global Botanic Garden Congress on oceanic island plant conservation (Dublin, June 2010)

<http://www.botanicgardens.ie/4gbgc/islands.html>

The rich, singular and extremely fragile insular endemic floras of the world are facing unprecedented risks as a consequence of the additive impacts of various biological and socio-economic factors such as habitat loss, population fragmentation, decline of pollinators, invasive species, and increasingly climate change. A recently published biodiversity audit estimated that at least 7000 insular endemic plant species worldwide may be highly threatened, some 3000 of them are considered to be critically endangered. We emphasise that the dire situation of many island plants also endangers unique ecosystems including its fauna, and may therefore trigger a further cascade of extinctions.

The threats faced by insular endemic floras are global, and only a coordinated international effort will provide the critical mass of knowledge needed to guide practical conservation work, applied conservation research and policy. We therefore highlight the critical problems that insular floras are facing, and recognize the urgent need to develop a global, oceanic island plant conservation network to share knowledge and expertise, discuss common challenges, and participate in the formulation and implementation of multi-disciplinary conservation objectives, political decisions and actions. We recognize that island plant conservation has grown substantially over the past decades and many successful good practice case examples are documented. However conservation action needs to be scaled up rapidly and gaps need to be identified and filled at local and international levels. The global conservation of island plant diversity should be recognized as a potent contribution to the sustainable development of islands, the restoration of natural capital and in particular watersheds and traditionally used plant resources.

We therefore recommend that:

- Island plant diversity be considered an immediate conservation priority
- Good practice examples be scaled up and conservation gaps identified and filled, and
- Botanic gardens and other relevant conservation institutions collaborate through the global, oceanic island plant conservation network established at this congress.

Peter's Plants



Bwa Matlo

PCA - The First Field Trip of 2010

By Marie-Therese PURVIS

PCA member

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The chosen spot was Glacis D'Antin, above Mare aux Cochons. Seven keen plant groupies met on a Sunday in February at the Le Niol waterworks for a morning's exploration of the glacis. The expedition was led by Katy; Bruno provided taxonomies, Heike had the plant books and the rest of us – Nathachia, Roland, Eric and I – added to the liveliness of the group.

The walk up to the Mare aux Cochons valley revealed an increase in the number of invasive *Clidemia hirta* (Fo watouk) plants, especially around the two streams that cross the path. Further on, a sizeable patch of native ferns close to the top of the ridge had almost disappeared. We also noticed the whole path had recently been cleared, in the current style of brush cutting: all earth banks are ripped clean of vegetation, whatever the plants might be. Most likely the ferns got chopped off in the process, as did several young Latannien fey and various other small plants. These are now fast being replaced by the more erstwhile invasives such as *Clidemia*. Perhaps some kind of induction programme is necessary for brush cutters working in nature reserves.



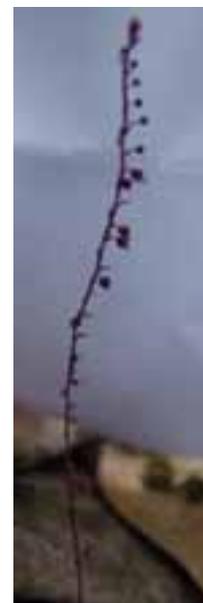
An endemic tree frog sleeps during the day, hiding in foliage, and is only active at night (E Frank).

The path to Glacis D'Antin was easy enough to find, and thankfully the ladders to the higher glacis areas are still in place. Not so the chains and other supports, which had rusted down to splinters. Of note on the way up to the glacis: most of the lichen and moss on the boulders was quite dry, in spite of recent rain, but it could be that the rain simply didn't reach this area. We noticed that several leaves of many Koko maron plants looked like they had been chewed through close to the ground, as if by some kind of insect. A search among the debris around their stems revealed nothing however, not even the elusive flowers or seeds of this plant. Two of us made friends with a tree frog tucked away under a Koko maron leaf (see photo), oddly translucent and curled up like a foetus, but it soon lost interest in the crowd of admirers and took off in a green flash.

As we climbed higher, the view over Beau Vallon and Port Launay opened out, and we discovered (at least for some of us new to this, and a rediscovery for others like me who can never retain the necessary details of plant species!) many of those plants called 'bwa' – Bwadnat, Bwa kato, Bwa kalou, Bwa zoliker and others I missed. From the top of the glacis we also got a good birds' eye view of the Ephelia Resort site at Port Launay, a mass of buildings more extensive than the NYS village of old, next to the largest patch of wetlands on Mahé – a blot on the landscape if ever there was one. Already a variety of pleasure boats crowded Port Launay bay.

But the most exciting discovery was the *Seychellaria* spotted by Katy, who knew where to look. Close scrutiny with her hand lens revealed the minute raspberry-like fruit of this tiny purple herb some 4cm high, which lives happily without chlorophyll. Of course having found one, several others then came to light in the humus-rich ground near the path back up to the ladders. Those with cameras had a field day all of their own.

A tiny plant of *Seychellaria* highlighted against white paper so that its structure can be seen (H Vierling).



A return to the Casse Dent trail.....

By Nathachia PIERRE and Mariette DINE

PCA members

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PCA organizes regular field excursions for its members and friends who share a mutual interest in plant conservation. This time we had the opportunity to discover more about the flora and fauna of the Casse Dent trail situated at Sans Soucis. As we made our way along the trail we welcomed the first appearance of a tiny endemic snail and the occasional calling of the invisible frog. From our leaders, Katy and Bruno, we learned many things and were able to identify some plant species present on previous field trips. One of the most common plants in one area was the large spreading bracken fern that often occurs in areas which have been previously burned. We also learned how to identify plants such as the endemic Bwa merl with its tooth-edged leaves and the distinctive veins of the Bwa rouz leaves.

At the end of the trail we made a stop at a magnificent little waterfall and then divided into two groups. One group continued along the Mare aux Cochons trail to later end up at Le Niol, and our group headed back where there was more to learn along the way. One of us picked up a peculiar large, shiny, light brown seed with one side wrinkled, later confirmed by our leader as a Kapisen seed. Nathachia is now faced with the challenge of trying to grow it at home!

The most enthralling thing about the excursion was the upland swamp that we didn't hesitate to explore. Katy found the shells of two mountain crabs and later checked to confirm that they were the endemic crab species. Frankly, it's the first time that I know that we have crabs on the mountain! Showing how little us Seychellois know about our own country. As A-level students doing biology as one of our subjects, we had the opportunity to learn more in depth about mosses and lichens, which one of us spotted on the floor. We discovered that lichens are made of two organisms: fungus and alga which form a symbiotic relationship. At that time, by chance, our biology class was doing Biodiversity and Conservation, so we took the specimens and showed them to the class. What used to be a boring Monday biology class turned into a session of excitement and amazement. Most of the students had little clue such plants even existed and we had fun classifying them according to their specific kingdoms.

The Casse Dent trail itself was quite easy and well maintained, so that we actually knew where we were putting our feet. As Seychellois living on this beautiful island we feel proud and happy to have discovered so many things about our country. Unfortunately, still not everyone knows the importance of plants and it's such a pity that few of us see the joy of exploring our natural environment.



Native vegetation dominates on this ridge along the Casse Dent trail (K Beaver).

In Notes from the Field of the previous issue of Kapisen (No. 10, p. 19) it was reported that seedpods of *Hypoxidia rhizophylla* (Pti koko maron) are rarely found, especially those that contain viable seeds. Does this threaten the long-term survival of the species? We needed to find out and we asked readers to report any observations. Justin Gerlach responded with the following information:

On Silhouette the *Hypoxidia* plants on the Jardin Maron path flower very regularly but we have never seen a flower on the Grande Barbe path. They produce small seed heads occasionally (I have never checked if these are viable and if so how many seeds they contain), and we once found a large, fully developed seed pod with a large number of seeds. I suspect pollination success may be an issue: muscid and calliphorid fly diversity and abundance is considerably lower on Mahé than on Silhouette and I assume these to be the pollinators (they are the only insects I have found at the flowers, but only once or twice).

Although *Hypoxidia* is not yet rare, it seems that more research should be carried out into the pollination and seed setting of this endemic herbaceous plant.



Flowers of *Hypoxidia* - more work needs to be done on their pollination and seed-setting (K Beaver).



This invasive creeping fern (*Lygodium japonicum*) has 3-pronged 'claws' with which it climbs up tree trunks (B Senterre).

PCA member Bruno Senterre reports a new species of alien fern on Mahé which seems to represent a threat to our biodiversity:

The species is *Lygodium japonicum* (Japanese climbing fern) and is a creeper. It is able to dominate the other species both in exposed areas and in the shade. It is probably not afraid of mountains, as it comes from a more temperate climate. And finally it is able to spread fast, far and in large quantities because it reproduces by means of tiny spores which can easily blow in the wind. The species was first discovered along Chemin Montagne Posée in 2009, later on the trails, roadsides, gardens and secondary forest of Cascade. Last month, while stopping along the Sans Soucis road, we discovered another population of this species, already spreading but not yet dominating as in the other sites.

We suggest that readers who see this species should report it to PCA, whether the plant is seen in gardens, in the forest, along roadsides or in plant nurseries.

Willy Andre has noticed that Zanblon (*Syzygium cumini*) is being affected by a pest/disease which prevents fruits from forming properly. He is worried that the related endemic Bwa ponm (*Syzygium wrightii*) may also be affected, so it would be appreciated if readers report to PCA any signs of poor fruit set in this species.

With all this talk of possible threats, it is nice to be able to report one good activity concerning PCA members in the field (apart from our enjoyable field trips that are reported elsewhere in this Kapisen). Over the past year, we have been able to collect several plant specimens for overseas researchers who are carrying out genetic research. This type of research can determine how certain Seychelles species are related to the same or similar species within the Indian Ocean region, for example. The collected specimens are suitably dried to preserve the genetic material (DNA) and the analysis is done in special laboratories at overseas museums and universities. PCA is very happy to collaborate with and assist foreign researchers who follow correct procedures and ask for the appropriate permission for such research.



Protarum sechellarum (Larourout dilenn maron) on Praslin (M LaBuschagne).

Another very recent piece of good news comes from Matt LaBuschagne on Praslin, who has found several previously unknown specimens of the uncommon *Drypetes* tree and a new site for *Protarum* at only 190m altitude. This is very interesting because on Mahé and Silhouette *Protarum* is only found at altitudes of 350m and above. It occurs in very damp sheltered undisturbed forest.

An exciting discovery was made by PCA members just before this Kapisen issue was completed. *Pisonia sechellarum* (Bwa mapou de gran bwa), which was thought to be only on Silhouette island, was spotted by Lindsay Chong-Seng growing in a very steep ravine on the north west slopes of Morne Blanc. This is the first record since Horne collected a very incomplete specimen of what was probably this species in 1874 near the summit of Morne Blanc.



Some PCA members and friends near the top of Morne Blanc after their exciting discovery.

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Seychelles Plant Conservation Research Agenda

The Seychelles Plant Conservation Research Agenda is a response to the National Strategy for Plant Conservation.

Edited by PCA members, it is the outcome of an international workshop held in Victoria in 2007.

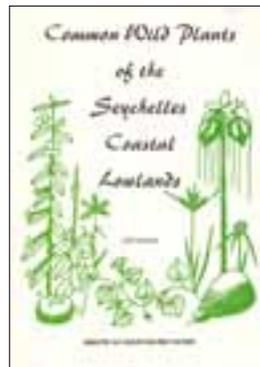
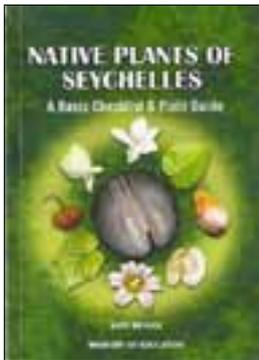
An electronic version of the Seychelles Plant Conservation Research Agenda can be downloaded here:

<http://seychelles-conservation.org/kapisen.aspx>

www.plantecology.ethz.ch/publications/books/kapisen

Local and international experts are most welcome to consider how they can contribute to the achievement of the targets!

Reprints of plant identification guides



Reprints of two plant identification guides are available now. Originally published by the Ministry of Education, their distribution has until now been very limited. The reprinted books are available from local book sellers and other outlets at a reasonable price. Profits from sales will go to PCA, so by buying copies of these books you will be supporting plant conservation!

The books are also available from the website of the Natural History Book Service <http://www.nhbs.com>.

PCA field trips



Sunday 5 December 2010

A new schedule of field trips is being developed for 2011. The first trip will probably be at a weekend in the middle of February and subsequently at two-month intervals.

Before the date, please contact Katy Beaver to find out details and arrangements

(email kbeaver@seychelles.net or telephone 241 104)

Join PCA!

Any person interested in plant conservation in the Seychelles, either from the Seychelles or somewhere else in the world, is invited to join the Plant Conservation Action group (PCA). As a member you support plant conservation in the Seychelles, get Kapisen - the PCA newsletter - twice a year sent to you by e-Mail, and get regular invitations to events and field excursions.

For joining PCA, contact Lindsay Chong-Seng (Chairperson) or Katy Beaver (Secretary) at

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